Preliminary survey of Wattled Ibis *Bostrychia carunculata* in Bale Mountains National Park, Ethiopia, with notes on abundance, habitat and threats

John Hughes

Inventaire préliminaire de l'Ibis caronculé *Bostrychia carunculata* dans le Parc National des Monts Bale, Ethiopie, avec notes sur l'abondance, le milieu et les menaces pesant sur l'espèce. Un inventaire préliminaire de l'Ibis caronculé *Bostrychia carunculata* a été réalisé dans la partie nord-est du Parc National des Monts Bale, Ethiopie, en janvier 2005. Pendant environ 100 heures d'observations sur le terrain, utilisant des transects et des comptages par point dans une zone de 27 km≈, au moins 246 ibis ont été notés. La densité d'Ibis caronculés était de 10 individus par km≈ et des groupes de 22–93 oiseaux ont été observés sur cinq sites. Dans la zone d'étude les Ibis caronculés dorment dans des arbres et évitent les cultures de céréales. Les problèmes du surpâturage et la coupe d'arbres, notés antérieurement, sont toujours présents, tandis que des nouvelles menaces potentielles comprennent l'érosion des sols, le défrichement pour l'agriculture et l'extraction d'eau.

Summary. The results of a preliminary survey of Wattled Ibis *Bostrychia carunculata,* conducted in the north-eastern part of Bale Mountains National Park, Ethiopia, in January 2005, are reported. During *c.*100 hours of field work, using line transects and point counts in an area of 27 km≈, at least 246 ibises were recorded. Wattled Ibises occurred at a density of 10 individuals per km≈ and at five sites groups of 22–93 birds were observed. In the study area Wattled Ibises roosted in trees and avoided cereal farmland. Previously recorded threats of over-grazing and tree-cutting still exist, whilst potential new threats include soil erosion, conversion to agriculture and extraction of ground water.

Wattled Ibis *Bostrychia carunculata* is endemic to Ethiopia, where it is locally common in the highlands at *c.*1,500–4,100 m (Brown *et al.* 1982, Matheu & del Hoyo 1992). No precise quantitative details are available; Birdlife International (2004) estimates the population at 10,000–25,000 individuals and considers the species as Least Concern. This paper reports on a 14-day survey of Wattled Ibis conducted in Bale Mountains National Park, *c.*400 km south of Addis Ababa, during a visit to Ethiopia from 13 January to 2 February 2005. Additional observations were made on the journey from Addis Ababa to and from the study area. My aim is to make a modest contribution to a more precise estimate of the species' population, its habitat preferences and threats to its survival. The survey was designed to be repeatable as a whole or in parts, and to facilitate comparison of populations between years and sites.

Study area and methods

The survey was conducted in the north-east corner of Bale Mountains National Park (06°30'N 39°55'E). The Bale Mountains have been identified as a biodiversity hotspot by Conservation International (Mittermeier *et al.* 2004) and the park is an Important Bird Area (EWNHS 2001). Five 10×10 km squares along the Didola–Delo Mena road and one 10×10 km square within the park were selected as the study area (Fig. 1). Half of the survey was conducted inside the park and the other half around the outer perimeter.

Equipment consisted of a Garmin Global Positioning System (GPS) receiver model 12 No 36155001, 8×42 binoculars and the Bale Mountains Trekking map 1/200,000 Digital Impressions Plc. It should be noted that the northing grid lines are labelled incorrectly on this map. The survey area is covered in more detail by the 1/50,000 topographical mapping series ETH 4 (DOS 450) Sheets 0739 D4 and 0740 C3

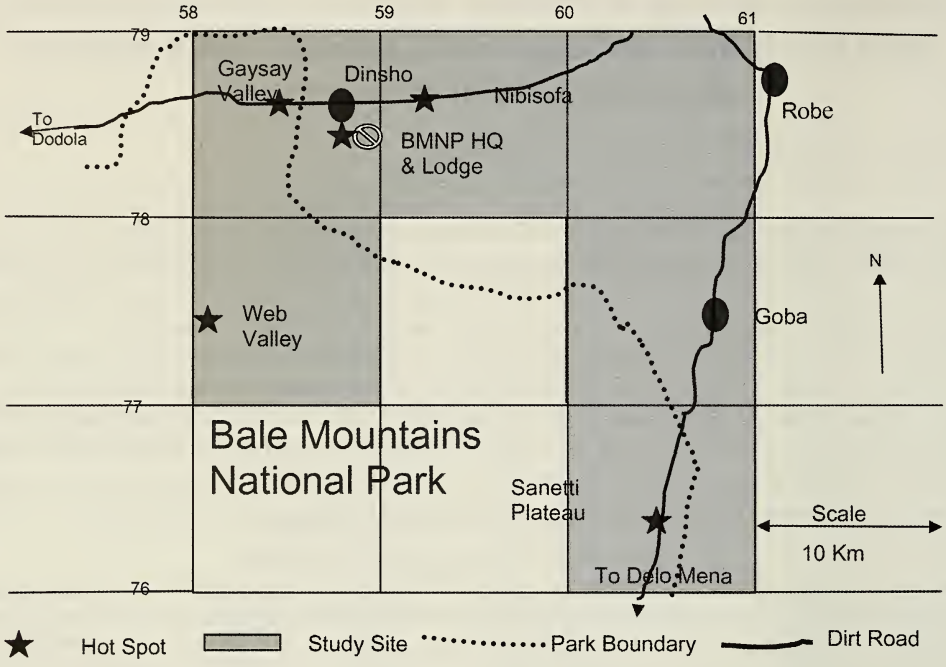

Figure 1. Study area and key sites. The study area is 400 km south of Addis Ababa in the Ethiopian Highlands along the dirt road linking Dodola and Delo Mena. It comprises six 10×10 km squares and includes the towns of Goba, Robe and Dinsho. The five sites marked with a star each held 22–93 Wattled Ibises *Bostrychia carunculata.* The dotted line marks the boundary of the national park.

Zone d'étude et sites principaux. La zone d'étude est située à 400 km au sud d'Addis Ababa sur les hautes terres éthiopiennes le long de la piste reliant Dodola à Delo Mena. Elle consiste en six carrés de 10×10 km et comprend les villes de Goba, Robe et Dinsho. Les cinq sites marqués d'une étoile contenaient chacun 22–93 Ibis caroncules *Bostrychia carunculata.* La ligne interrompue marque la limite du parc national.

Edition 1 SMGI/DOS 1976. All GPS observations and map references refer to UTM grid zone 37 and to the Adindan Datum. Before the survey commenced the GPS was set to the Adindan datum and GPS coordinates were compared with the map grid reference to confirm compatibility.

Survey methods The survey was undertaken using modified line transects (traversed either on foot, horseback or by four-wheel-drive vehicle) and point counts (Bibby 1992). Eight line transects, varying in length between 6 and 30 km with a width of 100 m either side, were surveyed by two observers (Table 1). Transects were surveyed on average four times (range 1–8). The total length of transects was 116 km and the area surveyed 23.2 km≈. The survey effort split between two observers amounted to 57.4 hours. In addition, line transects were carried out by a single observer on foot amounting to 15.5 hours. Only Wattled Ibises were counted. The birds surveyed were usually seen feeding on the ground in flocks (Fig. 2). Ibis flying across the transect line were not recorded. Shortage of time and the rapid movement of the vehicle prevented close scrutiny, so immatures were included in the survey. Small ibises with flesh-coloured legs and without wattles were assumed to be juveniles/immatures. To maximise the encounter rate, the more detailed transect survey on horseback, conducted at the end of the study period, avoided agricultural land and kept to valley bottoms where sightings of ibises were more likely.

Point counts were undertaken at five locations. At three of these, counts were made only once, for periods of 30–60 minutes. The remaining two, in

Table 1. Summary of line transects.

Tableau 1. Aperçu des transects.

Line transect	Length (in km)	Area (ha)	Number of times transect surveyed	Total obs time (hrs)	Total number of ibis seen on all surveys	Minimum number of ibis along transect	Habitat type	Sightings per hour of observation	Ibis per km sq
1	6	120	2	2	0	0	G1	0	0
2	13	260	8	8	0	0	H1	0	0
3	30	600	6	12	158	58	H1 & G1	13.2	9.7
4	7	140	3	3	74	30	G1	24.6	21.4
5	25	500	4	8	49	22	H1&G1	6.1	5.5
6	8	160	1	4	31	31	G1	7.8	19.4
7	12	240	6	28.4	324	93	G1	11.4	38.8
8	15	300	2	7.5	13	7	G1	1.7	2.3
Totals	**116**	**2,320**	**mean 4**	**72.9**	**649**	**241**	**8.9**	**10.4**	

Robe and at the park headquarters, were at camp locations, where it was convenient to make counts at dawn and at dusk. Despite the point count location in Robe being in the middle of town, ibises were recorded flying to and from roosts. The location at the park headquarters was surrounded by *Hagenia* and juniper trees and ibises roosting in these trees were recorded on most mornings and evenings. To avoid duplication, birds at roosts were not included in the population estimate. The area surveyed by point counts was 4.05 km≈ and the survey effort was 28 hours.

Although the survey was conducted in the dry season, it did rain, but this did not significantly reduce visibility, which was generally good. The wind was moderate. Survey work was undertaken in daylight, except at the roosts.

Habitat Each time a Wattled Ibis was sighted, the habitat in which it occurred was noted following the classification of Urban & Brown (1971), with two habitat types (H1 and H2) added to take into account characteristics in the Robe area. The following habitats were encountered during the survey:

M2 Giant Lobelia–*Alchemilla*–tussock grass moorland, 3,800–4,100 m

F1/ F3 *Hagenia* forest and Juniper–*Podocarpus* forest, 2,400–3,200 m

G1 Highland grassland, 1,800–2,750 m (reaching 3,400 m in the Web Valley)

D4 Cliffs and gorges, mainly bare rock

A5 Highland streams and marshes

H1 Cereal-based agriculture

H2 Town and urban areas

Threats A checklist produced by the Ethiopian Wildlife and Natural History Society (1996) to classify existing and potential threats to birds as critical, major or low, was used in the survey. Threats were identified by personal observations and through discussions with local authorities.

Results

Wattled Ibis proved easy to identify whilst travelling in a vehicle, as the species is large with a distinctive profile and diagnostic white wing-patch, and prefers open areas. It is only likely to be confused with the Hadada Ibis *Bostrychia hagedash,*

Table 2. Summary of point counts.

Tableau 2. Aperçu des comptages par point.

Point	Area (ha)	Obs time (hrs)	Number of sightings	Min. number of ibis feeding	Habitat type	Sightings per hour	Ibis per km sq
1	100	0.5	0	0	G1	0	0
2	100	0.5	5	5 feeding	H1	10	5
3	100	20.0	8	0	H2	0.4	0
4	10	6.0	37	14 roosting	F1/F3	6.2	140
5	100	1.0	0	0	G1, D4 &A5	0	0
Totals	**405**	**28**	**49**	**5**	**1.8**	**n/a**	

Table 3. Size of feeding flocks of Wattled Ibis *Bostrychia carunculata* in the Bale Mountain area.

Tableau 3. Taille des groupes d'Ibis caroncules *Bostrychia carunculata* à la recherche de nourriture dans la zone des Monts Bale.

Flock size	Single ibis	2 birds	3–9 birds	10–19 birds	20+ birds
Number of flocks	6	12	34	5	15

but this species is uncommon and none was found in the study area. The call is a far-carrying honking, uttered for 4–5 seconds on take-off. Most birds seen had wattles of *c.*5 cm in length with a diameter of *c.*0.5 cm.

Wattled Ibises were recorded on 82 occasions and a total of 698 birds was observed (Tables 1–2). The minimum count (based on line transects and point counts) was 246 adult and immature Wattled Ibises. Most sightings were of birds feeding in small or larger flocks (Table 3).

Local abundance The area surveyed totalled 27.25 km≈ or 4.5% of the study area. In the study area Wattled Ibises were found at a density of 10 birds per km≈. Five key sites, each containing 22–93 ibises, were identified (Table 4). All lay close to the road and were relatively easy to access. As line transects and point count locations were chosen opportunistically, the selection was not sufficiently rigorous to permit a statistical analysis of the data. The survey was conducted in a very small geographical area (600 km≈) and is thus not representative of the Bale region or the total range of the species. GPS coordinates for the point count locations and the line transects (enabling repeat surveys) are available from the author.

Table 4. Wattled Ibis *Bostrychia carunculata* key sites.

Tableau 4. Sites importants de l'Ibis caronculé *Bostrychia carunculata.*

Site	Grid coordinates	Flock size	Park boundary
Sennetti Plateau	06°53'N 39°54'E	22	Inside
Nibisofa	07°06'N 39°50'E	58	Outside
Web Valley	07°01'N 39°44'E	93	Inside
Gaysay Valley	07°07'N 39°47'E	30	Inside
Disho Lodge roost	07°06'N 39°48'E	14	Inside

Table 5 Wattled Ibis *Bostrychia carunculata* roosting in trees.

Tableau 5. Ibis caroncules *Bostrychia carunculata* au dortoir.

Date and Location	Time	
	Departing roost	Roosting
24 January, Dinsho Lodge	18.00 hrs	3
26 January, Dinsho Lodge	06.30 hrs	14
26 January, Dinsho Lodge	17.15 hrs	3
26 January, Dinsho Lodge	18.00 hrs	4
27 January, Dinsho Lodge	06.30 hrs	6
27 January, Dinsho Lodge	09.30 hrs	2
31 January, Nibisofa	09.10 hrs	8
Totals	**30**	**10**

General habitat Wattled Ibises were most often seen feeding in flocks of 3–9 or 20+ birds (Table 3). They fed on agricultural land that had been left fallow for 1–2 years, in areas of short damp grass (G1) and in highland vegetation including rough tussock grass (M2). They were frequently seen close to villages and towns. In Addis Ababa, they were seen feeding in the company of the locally more common Sacred Ibis *Threskiornis aethiopicus.* Along the Dodola–Dinsho road they were seen feeding with Warthogs *Phacochoerus aethiopicus.* None was seen feeding in stubble, cornfields or freshly ploughed fields (H1) or in the extensive wheat fields surrounding the town of Robe. The birds appear to prefer level ground; only once were they seen feeding on a slope. Only on rare occasions were individuals observed near trees, except when roosting. They were not recorded in scrub, woodland or forest (F1/F3), or in water. They flew to their tree roosts at 17.00–18.30 hrs and departed at 06.30 hrs (Table 5), and appeared to roost in pairs. No nests were found and no courtship displays observed. The species was more abundant within the National Park, but this is more likely due to the fact that there are few cultivated areas inside the park, rather than it offering any protection.

Threats In general Wattled Ibises are not persecuted. The Oromo people who inhabit the Bale area

Figure 2. Feeding flock of Wattled Ibises *Bostrychia carunculata* (Catherine Hughes)
Groupe d'Ibis caronculés *Bostrychia carunculata* à la recherche de nourriture (Catherine Hughes)

live in harmony with the birds. In the study area two threats could be classified as major: over-grazing and tree-cutting. Potential threats may come from soil erosion, conversion to agriculture (farmers from the north of the country have been relocated to this area) and extraction of ground water (small-scale extraction and irrigation has started and there are plans to expand the process).

Acknowledgements

I am grateful to Xavier Oudard for his notes on four line transects that he completed on foot in the Web Valley on 31 January and 1 February 2005. I thank Ken Wright, Simon Strickland and John Ash for their helpful comments on a draft of this paper, and Ron Demey and Guy Kirwan for their significant contribution to the final version.

References

Bibby, C. J., Burgess, N. D. & Hill, D. A. 1992. *Bird Census Techniques.* London, UK: Academic Press.

BirdLife International. 2004. *Threatened Birds of the World 2004.* CD-ROM. Cambridge, UK: BirdLife International.

Brown, L. H., Urban, E. K. & Newman, K. 1982. *The Birds of Africa.* Vol.1. London, UK: Academic Press.

Ethiopian Wildlife and Natural History Society (EWNHS) 1996. *Important Bird Area of Ethiopia: A First Inventory.* Addis Ababa: EWNHS.

Ethiopian Wildlife and Natural History Society (2001) Ethiopia. In Fishpool, L. D. C. & Evans, M. I. (eds.) *Important Bird Areas in Africa and Associated Islands: Priority Sites for Conservation.* Newbury: Pisces Publications & Cambridge, UK: BirdLife International.

Matheu, E. & del Hoyo, J. 1992. Family Threskiornithidae (ibises). In del Hoyo, J., Elliott, A. & Sargatal, J. (eds.) *Handbook of the Birds of the World.* Vol. 1. Barcelona: Lynx Edicions.

Mittermeier, R. A., Robles Gil, P., Hoffmann, M., Pilgrim, J., Brooks, T., Mittermeier, C. G., Lamoreux, J. & da Fonseca, G. A. B. 2004. *Hotspots Revisited: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions.* Mexico City: CEMEX.

Urban, E. K. & Brown, L. H. 1971. *A Checklist of the Birds of Ethiopia.* Addis Ababa: Addis Ababa University Press.

Wideawake Surveys, The Old Shop, High St., Shipton Bellinger, Hampshire SP9 7UE, UK. E-mail: John@rasuk.org

Received 2 August 2005; revision accepted 22 May 2006